INSTRUMENTAL ANALYIS OF SENSORY PROPERTIES OF CHICKEN MEAT TREATED BY COMBINED THERMAL AND NONTHERMAL FOOD PRESETVATION TECHNIQUES

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Abstract

Modern food processing procedures try to provide gentle ways to ensure safety of treated food products in order to meet consumer expectations. Minimally processed food products are prepared based on principles of hurdle technologies. Sous-vide heat treatment is a series of different food operations. Key to mention: selection, sorting, preparation (eg cutting), processing (seasoning, dosing), vacuum packing, heat treatment, cooling, chilled storage, regeneration and serving of raw materials. Among the non-thermal processes, high hydrostatic pressure treatment (HHP) can be successfully applied as a physical barrier during food processing. At present, the marketing of HHP treated foodstuffs requires maintenance of a cold chain. The temperature of the cold chain has great significance, but maintaining of low temperature is a serious burden on the manufacturer. If this cooling requirement can be slightly relaxed, it is possible to produce and sell products more economically. In our investigations we wanted to find out how the combination of gentle heat treatment (sous-vide) and high hydrostatic pressure treatment applied in different order, space and time affect the instrumentally measurable sensory properties of chicken meat.

Raw chicken breasts were purchased from the local commercial market. They were cut into half and placed into vacuum bag and then sealed. Part of the samples were heat-treated in a water bath at 55 and 60 ± 1 ° C for 60 minutes. The high hydrostatic pressure treatment was carried out at 300 or 600 MPa for 5 minutes at room temperature. In addition to single, heat-treated and only pressure-treated samples, we also performed combined treatments. Part of the samples were first heat-treated, then pressurized, the other part was first pressurized and then heat-treated. Colour was measured using a Minolta CR-400 chroma meter. Texture measurements were carried out at room temperature with a Stable Micro System TA XT Plus instrument. Head space analysis of samples was performed by an NST3320 type electronic nose. For the evaluation of electronic nose results multivariate statistical analysis were used, namely, Canonical Discriminant Analysis (CDA).

In case of single treatments, L* (brightness) and b* (yellowness) increased as effects of pressure and sous-vide treatment. Increasing L* values show that when higher temperature or pressure was applied the sample became brighter. The tendency of results were more complex when combined treatment were applied. Multifactor variance analysis of results of combined treatments has statistically confirmed that all three factors (heat treatment temperature, pressure level and order of treatments) have significant effect on L* of meat. The statistical analysis of results of texture and electronic nose measurement also justified that these factors had significant effect on sensory properties.

Key words: chicken meat, sous-vide, HHP, sensory properties

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